

REMARKS

Status of the Claims

Claims 34-35, and 37-53 remain pending in the present application, Claims 1-33 having been previously canceled as being directed to a non-elected invention, and Claim 36 having been canceled in the present amendment. Claims 34 and 37-53 have been amended to more clearly define the invention.

Telephone Interview with the Examiner

On November 15, 2005, in a telephone interview, applicants' attorney (Michael King, Registration No. 44,832), Examiner Gailene Gabel, and Supervising Examiner Long V. Le discussed the Final Office Action dated July 29, 2005. In particular, applicants' attorney requested the telephone interview to discuss the indefiniteness rejections based on the terms "feature," "object," and "associated with" as used in applicants' claims.

Examiner Gabel indicated that it was apparent that one aspect of the claims was directed to analyzing a biological cell by attaching labeled probes to cellular components. Examiner Gabel reiterated the point raised in the Office Action that the term “feature” was indefinite, because a feature can be interpreted as a color (to which a probe cannot logically be attached), and again noted that the terms “object” and “feature” appear to be used interchangeably in the specification.

Applicants' attorney suggested deleting the language in the specification where feature and object were used interchangeably, and amending the claims to recite a physical feature, since the specification clearly supports attaching a probe to a feature. Examiners Gabel and Le were concerned that there was no literal support in the specification for the term "physical." Examiners Gabel and Le did indicate that if the terms "biological cell" and "cellular component" were used in place of the terms "object" and "feature," respectively, the indefiniteness rejection based on the term "associated with" would be withdrawn.

Applicants' attorney then directed the discussion to the language of step (b) in Claim 34, and explained the language recited in this step should be considered as distinguishing over the cited art, rather than being contradictory. Essentially, he noted that the current claim recitation distinguishes over the cited art by using two different signaling components to identify a feature. The different signaling components can be part of the same probe (see Feature 3 of FIGURE 2B), or different probes (see Feature 3 of FIGURES 2D, 2E, 2F, and 2G). While no specific agreement on the patentability of

1 any of the pending claims was reached, Examiners Gabel and Le agreed to reconsider the application in
2 light of written arguments discussing these issues in more detail.

3 Applicants' attorney would like to thank Examiners Gabel and Le for their consideration and
4 willingness to discuss the issues noted above during this telephone interview.

5 Amendment to the Specification

6 The amendment to the specification does not add any new matter, and eliminates the
7 possibility that any indefiniteness can exist with respect to the terms "object" and "feature." One
8 amendment presented herein simply deletes the term "object" where used simultaneously with the
9 term "feature," to avoid any indefiniteness.

10 The Examiner has recognized that one type of object the present invention can be used in
11 conjunction with are biological cells. Biological cells include features such as cellular components to
12 which labeled probes can be attached. However, it must be recognized that the specification clearly
13 includes language encompassing different types of objects (i.e., objects that are not biological cells).
14 As indicated in the specification as filed, aspects of the technology developed by applicants are
15 directed to a method and apparatus for probing and subsequent simultaneous analysis of a multitude
16 of features in cells, biological matter, and other objects (see page 6, third paragraph of applicants'
17 specification). Clearly, at the time the application was filed, applicants intended the term "object" to
18 encompass other types of objects, *in addition to biological cells*. Applicants respectfully direct the
19 Examiner's attention to FIGURES 2B-2G, each of which schematically illustrates an object including
20 three different features to which labeled probes can be attached. Applicants have submitted an
21 amendment to the specification herein that introduces the following language: "*Probes labeled in*
22 *this manner can be used with biological cells where the features are cellular components and can*
23 *also be used with objects that include features (i.e., features that are part of the object) to which the*
24 *binding elements can be selectively bound.*" Such language provides literal support for the language
25 in the claims directed to labeled probes attached to features that are part of objects, as well as labeled
26 probes attached to cellular components that are part of biological cells.

27 These amendments do not introduce new matter into the patent application and are entirely
28 supported by the specification and drawings as originally filed, for the following reasons.
29 MPEP 2163.06 is particularly pertinent to the issue of the relationship of the written description
30 requirement to new matter. This portion of the MPEP states that "information contained in *any one*

1 of the specification, claims or *drawings* of the application as filed may be added to any other part of
2 the application without introducing new matter.” (Emphasis added.)

3 Attaching labeled probes to cellular components of biological cells has been clearly disclosed
4 in FIGURES 3, 9A, 9B, 11, and, 12, and the related textual description accompanying each Figure
5 provided in the specification as filed. These Figures and their accompanying text describe two color
6 FISH probes (i.e., labeled probes including two different optical signaling components) being
7 attached to cellular components in biological cells (such as X and Y chromosomes), and optically
8 analyzing the spectral signatures of the biological cells to identify specific features (i.e., cellular
9 components) to which the labeled probes have been bound. The specification as filed provides
10 extensive support for the terms “cellular features” (see at least page 1, paragraph 0002 of the
11 published application) and “cellular components” (see at least page 1, paragraph 0003 of the
12 published application). There appears to be absolutely no reasonable basis to conclude that one of
13 ordinary skill in the art would not have understood the specification and drawings as filed to
14 encompass the concept of attaching labeled probes to cellular features in biological cells.

15 Attaching labeled probes to *generic* features of a *generic* object has been clearly disclosed in
16 FIGURES 2B-2F, and 12, and the related textual description for each of these Figures provided in the
17 specification as filed. These Figures and their accompanying text describe generic objects that
18 include at least three different generic features to which labeled probes can be attached. While the
19 Examiner has indicated that the term feature could be broadly construed to encompass a non-physical
20 property such as color, there is simply no evidence to support a conclusion that one of ordinary skill
21 in the art, when presented with FIGURES 2B-2F and the related textual description, would conclude
22 that applicants were attempting to bind a labeled probe to a non-physical feature, such as a color.
23 Further, FIGURES 2B-2F each clearly illustrate three different features to which a labeled probe can
24 be attached. Such features are clearly shown as being part of an object. FIGURES 2B-2F clearly
25 provide support for the following language indicating that labeled probes “*can also be used with*
26 *objects that include features (i.e., such features are part of the object) to which such binding elements*
27 *can be selectively bound.*” Based on FIGURES 2B-2F and the related textual description, it appears
28 that one of ordinary skill in the art would readily recognize that applicants’ novel approach
29 encompasses attaching labeled probes to features that are part of an object. Simply because labeled
30 probes cannot be logically attached to some types of features (such as color) does not merit a

1 conclusion that applicants' specification does not describe and thus provide support for attaching
2 labeled probes to features which are part of an object. FIGURES 2B-2F clearly show attaching
3 labeled probes to features that are part of an object. Clearly, there exists some types of features (i.e.,
4 physical features) to which labeled probes can be attached. The present novel approach thus
5 encompasses features to which labeled probes can be attached, even if other features are incapable of
6 accommodating a labeled probe. There appears to be absolutely no reasonable basis to conclude that
7 one of ordinary skill in the art would not have understood the specification and drawings as filed to
8 encompass the concept of attaching labeled probes to features that are part of an object, because this
9 approach is clearly illustrated in FIGURES 2B-2F.

10 These amendments to the specification of the patent application are therefore entirely
11 consistent with the application as filed, do not introduce new matter, but instead, simply provide
12 literal support in the specification for the recitation used the claims.

13 Rejections of Claims 34-51 under 35 U.S.C. § 112

14 The Examiner has rejected Claims 34-51 under 35 U.S.C. § 112, second paragraph, as being
15 indefinite for failing to particularly point out and distinctly claim the subject matter that applicants
16 regard as their invention. In particular, the Examiner asserts that the term "feature" is indefinite,
17 because the claims recite that a labeled probe can be bound to a feature, and the Examiner considers
18 size or color to be features to which a labeled probe cannot be bound. The Examiner further asserts
19 that the terms "object" and "associated" are indefinite. However, in the light of the amendments and
20 the discussion presented above, applicants respectfully disagree for the following reasons.

21 The Indefiniteness of the Term "Feature" in Claims 34 and 42

22 The Examiner has asserted that the term "feature" is indefinite because the Examiner
23 considers a size or color of an object to be a feature, and concludes that logically, one cannot bind a
24 labeled probe to a size or color feature of an object. Applicants have amended Claims 34 and 42 to
25 include language emphasizing that the recited features are: (1) part of an object; and, (2) labeled
26 probes can be attached to many other features. Thus, the recited features are distinguishable from
27 size or color, because the language of the claim restricts the scope of the term feature only to the
28 types of features to which a labeled probe can be attached. The amendments are entirely consistent
29 with the application as filed, and as discussed above, an amendment to the specification has been
30 made to provide even clearer support for features that are part of objects and to which labeled probes

1 can be attached. Significantly, the specification clearly describes labeled probes including a binding
2 element and a signaling element. The specification also clearly describes attaching probes to features
3 such that the binding element of a probe couples to the feature (see FIGURES 2A-2G and their
4 related text in the specification). The specification also clearly describes cellular components as
5 being features. The specification also clearly describes that the present novel approach encompasses
6 a method and apparatus applicable not only to biological cells (which include features such as cellular
7 components), but also, other types of objects as well. Those other types of objects would not include
8 cellular components, because they are not biological cells. Thus, the term "feature" was intended to
9 encompass physical features that are part of an object, so that a suitably configured probe can bind to
10 the feature, and appropriate amendments have been made to the claims so that it will be apparent that
11 the term "feature" refers only to features to which a labeled probe can be attached. It should also be
12 recognized that the term "cellular component" is unduly limiting, because the specification explicitly
13 states that the novel approach is not limited to objects that are biological cells. In light of the above
14 noted amendments to the specification and claims, the rejection of Claims 34-51 under
15 35 U.S.C. § 112, second paragraph, as being indefinite for the use of the term feature, should be
16 withdrawn.

17 Indefiniteness of the Simultaneous Use of "Object" and "Feature" in Claims 34 and 42

18 The Examiner further asserts that the terms "feature" and "object" as recited in Claims 34 and
19 42 are indefinite, because it is unclear how each term should be interpreted, specifically because the
20 specification on pages 6 and 7 uses these two terms interchangeably.

21 Applicants have amended the specification to avoid any confusion with respect to the terms
22 feature and object. A further amendment to the specification, discussed in detail above, provides
23 literal support for the use in the claim language of the term "feature" so that it is apparent that the
24 claims encompass only features to which a labeled probe can be attached (FIGURES 2A-2F clearly
25 show labeled probes being attached to features that are part of an object).

26 Applicants note that the specification makes it clear that one particularly preferred exemplary
27 implementation involves objects that are biological cells having a plurality of different cellular
28 features (i.e., cellular components). The claims employ the term "object" in place of "cell,"
29 specifically because the multiplex encoding scheme of the present invention can be used in
30

1 connection with analyzing objects that are NOT biological cells, so long as probes can be bound to
2 features that are part of the object (as shown in FIGURES 2A-2F).

3 Based on the amendment to the specification and the remarks set forth above, it should be
4 apparent that there is no ambiguity between the terms "object" and "feature" as recited in Claims 34
5 and 42. Accordingly, the rejection of Claim 34 and Claim 42 under 35 U.S.C. § 112, second
6 paragraph, as being indefinite for the simultaneous use of the terms "object" and "feature," should be
7 withdrawn.

8 Indefiniteness of the Term "Associated with the Object" in Claims 34, 42, 43 and 47

9 The Examiner further asserts that the term "associated with the object" as employed in
10 Claim 34, step (b) is ambiguous. The phrase is similarly employed in Claims 42, 43 and 47 and is
11 objected to for the same reasons. The Examiner has asserted (first paragraph, page 4 of the Final
12 Office Action dated July 29, 2005) that applicants have not established *on the record* how a feature
13 can be associated with an object.

14 Applicants respectfully disagree. In applicants' previous response, which is clearly on the
15 record, applicants stated the following:

16 The term associated with has been employed because features of objects can be
17 internal (i.e., a nucleus or other internal component) or external (i.e., a surface
18 protein). Logically, both internal and external features are encompassed by the
19 term "associated with an object" (clearly, both a cell nucleus and a surface
20 protein are associated with a cell). The term "on the object" would be
21 insufficient because some features may not be on the surface of an object, but
22 may be contained within the object, such as a nucleus of an object that is a
23 biological cell. The term "in the object" would also be insufficient because
24 some features may not be encompassed within an object, such as surface
25 proteins present that are on the outer surface of a biological cell. While
26 applicants could have used the term "part of an object," MPEP 2173.05 clearly
27 articulates the concept of allowing an applicant latitude in the manner of
28 expression and the choice of terms used in claims, particularly if there is no
29 evidence that the terms employed would not have been understood by one of
30 ordinary skill in the art.

27 The above statement should have provided sufficient explanation to justify the intended scope
28 and acceptability for applicants' use of the term "associated with."

29 However, in order to advance prosecution of the present application, applicants have replaced
30 terms such as "the feature is associated with the object" in the claims with some form of the term "the

1 feature is part of the object.” The specification has been amended to provide literal support for the
2 term “part of the object.” Such an amendment does not introduce new matter, because the
3 specification already describes features that are part of an object (cellular components, where the
4 object is a biological cell) and because FIGURES 2A-2F each clearly illustrate a generic object (i.e.,
5 an object not limited to a biological cell) including three features that are part of the object.

6 Based on the amendment to the specification and claims, and the remarks set forth above, the
7 rejection of Claims 34-51 under 35 U.S.C. § 112, second paragraph, as being indefinite for the use of
8 the term “associated with,” should be withdrawn.

9 Indefiniteness of Step (b) in Claim 34

10 The Examiner further asserts that Claim 34 is indefinite because of an inconsistency between
11 step (a) and step (b) of Claim 34. Specifically, the Examiner notes that step (a) recites *at least one*
12 *optical signaling component* and step (b) recites a plurality of different optical signaling components.
13 However, there is no inconsistency in this claim, as will become clear if the claim is logically parsed.
14 It is important to appreciate that this specific situation has clearly been shown in the drawings and
15 described in the specification as filed. Indeed, this language distinguishes over the cited art.

16 FIGURE 2B clearly illustrates a labeled probe 412c bound to a feature 418. Labeled
17 probe 412c includes two different optical signaling components, signaling element 410a and
18 signaling element 410b. FIGURE 2D clearly illustrates a plurality of labeled probes 412c attached to
19 a plurality of binding sites 428a-428c of Feature 3. The labeled probes attached to binding sites 428a
20 and 428b each includes signaling element 410a, while the labeled probe attached to binding site 428c
21 includes signaling element 410b. Thus, FIGURES 2B and 2D each shows a single feature to which a
22 plurality of different signaling elements have been bound. In FIGURE 2B, a single probe including a
23 plurality of different signaling elements has been bound to a feature. In FIGURE 2D, a plurality of
24 labeled probes, each labeled probe including only one signaling element, is bound to a feature such
25 that the feature is labeled with a plurality of different signaling elements. Claim 34 has been crafted
26 to define a method encompassing both of the above described embodiments.

27 Steps (a) and (b) of Claim 34 are reproduced below:

28 (a) *providing at least one labeled probe that selectively binds to said feature,*
29 *wherein said at least one labeled probe comprises a binding element that selectively binds to at least*
30 *a portion of said feature, and at least one optical signaling component;*

(b) exposing said object to said at least one labeled probe under conditions that cause said at least one labeled probe to bind to at least a portion of said feature, if said physical feature is part of said object, such that a plurality of different optical signaling components become bound to said feature;

Step (a) applies to Feature 3 of both FIGURES 2B and 2D. Similarly, step (b) also applies to Feature 3 of both FIGURES 2B and 2D. Claim 34 thus recites a method in which a plurality of optical signaling components are attached to the same feature. This result can be achieved by using a plurality of singly labeled probes (Feature 3 of FIGURE 2D), or by using a single labeled probe including a plurality of signaling components (Feature 3 of FIGURE 2B).

Clearly, the method steps recited correspond to embodiments disclosed in the specification, and are not indefinite. Accordingly, the rejection of Claim 34 under 35 U.S.C. § 112, second paragraph, as being indefinite because step (b) contradicts step(a) should be withdrawn.

Rejection of Claims 34-51 under 35 U.S.C. § 102

The Examiner has rejected Claims 34-51 under 35 U.S.C. § 102 as being anticipated by Dunlay (U.S. Patent No. 6,620,591). The Examiner asserts that Dunlay discloses each element of applicants' claimed invention. Applicants respectfully disagree for the following reasons.

The Examiner has recognized that applicants assert that the present invention can be distinguished from Dunlay because at least one feature associated with an object will be probed using at least two different signaling components. The Examiner then asserts that this feature is not recited in the claims. That assertion is incorrect. As noted above, Claim 34 has been crafted to encompass an embodiment in which a feature is probed with two different signaling components using a plurality of singly labeled probes (Feature 3 of FIGURE 2D), as well as an embodiment in which a feature is probed using a single labeled probe including a plurality of signaling components (Feature 3 of FIGURE 2B).

The key language in Claim 34 reciting that a feature associated with an object will be probed using at least two different signaling components is step (b) which requires *that a plurality of different optical signaling components become bound to the physical feature*. As discussed in detail above, this result can be achieved by using a plurality of labeled probes including only a single signaling component, or by using a single labeled probe including a plurality of different signaling components. Claim 34 thus distinguishes over the cited art. Independent Claim 42, step (b) similarly

1 recites such that at least two optical signaling components become bound to each specific feature.
2 Claim 42 thus also distinguishes over the cited art. There is no evidence that one of ordinary skill in
3 the art would have modified the technique disclosed by Dunlay, or any other prior art, to achieve an
4 equivalent invention. Each claim depending upon Claims 34 and 42 must be patentable for at least
5 the same reasons. Accordingly, the rejection of Claims 34-35, and 37-51 as a being anticipated by
6 Dunlay should be withdrawn (Claim 36 having been canceled in the present response).

7 The Examiner has also recognized that applicants assert that the present invention can also be
8 distinguished over Dunlay because in the present novel approach, data (i.e., light) from all probes
9 bound to a specific feature of an object are collected *simultaneously*. According to Dunlay, data for
10 each channel must be collected individually. Dunlay clearly describes that initially data for a primary
11 channel is collected, and that collected data is processed (see step 105 of FIGURE 7, and column 6,
12 lines 33 to 43). Only later will data for each additional channel be collected. When four different
13 fluorescent labels are used, four channels of data are collected. Note Dunlay explicitly teaches that
14 the camera's exposure time is *separately adjusted* for each dye to ensure a high quality image from
15 each channel (column 6, lines 32-35). Logically, the only way the camera can be separately adjusted
16 for each channel is if data for each channel is collected at a different time.

17 Step (c) of Claim 42 explicitly recites the step of "simultaneously detecting light from all
18 optical signaling components bound to any specific feature that is part of said object." The language
19 employed in Claim 42 requires light from each signaling component that is part of any labeled probe
20 that is attached to any feature of the object to be collected simultaneously. Dunlay collects light from
21 optical signaling components sequentially, rather than simultaneously. The techniques simply are not
22 equivalent.

23 It is well understood that dependent claims are patentable for at least the same reasons as
24 claims upon which they depend; thus, each claim depending from Claim 42 must also be patentable.
25 There is no basis for concluding that it would have been obvious to one of ordinary skill in the art to
26 modify Dunlay's technique to achieve applicants' novel approach as defined in Claim 42.
27 Accordingly, the rejection of Claims 42-51 as being anticipated by Dunlay, should be withdrawn.

28 Patentability of Newly Added Claims/Restriction Requirement

29 Applicants have previously added new Claims 52 and 53, neither of which introduces new
30 matter. The Examiner has asserted that these claims are directed to an invention that is independent

1 or distinct from the invention originally claimed, because Claims 52 and 53 require the use of a set of
2 labeled probes, where the originally presented claims require only at least one labeled probe. As
3 discussed above, the originally presented claims actually encompass a method that can be
4 implemented using *either* a single labeled probe including a plurality of signaling components, or a
5 plurality (i.e., a set) of singly labeled probes, such that the plurality of singly labeled probes includes
6 a different signaling component. Thus, the originally presented claims *do* encompass a set of labeled
7 probes. Accordingly, restriction is improper and should be withdrawn. Furthermore, it should be
8 noted that Claims 52 and 53 are distinguishable over the cited art for the same reasons as Claims 34-
9 51, and there is no evidence that the examination of Claims 52 and 53 with Claims 34-51 would
10 represent any additional burden, or require any additional search.

11 Claim 52 recites that the features are part of the object and that labeled probes can be attached
12 to the features. Claim 52 represents a redrafting of Claim 34 to emphasize the novel aspects of the
13 present approach. Significantly, Claim 52 recites both the element of using at least two different
14 spectrally distinguishable optical signaling components to uniquely identify a specific feature, and
15 simultaneously collecting light from all optical signaling components associated with an object. As
16 discussed above, Dunlay specifically describes collecting light from the different fluorescent dyes
17 separately, and using only one signaling element (i.e., fluorescent dye) to uniquely identify each
18 feature. Claim 52 is therefore patentable in view of the cited art.

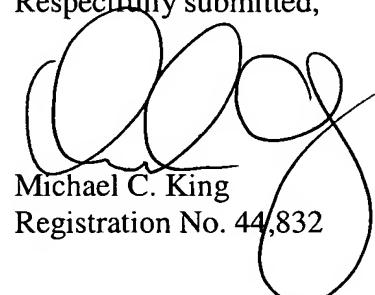
19 Claim 53 is generally based on Claim 42 and defines a process for probing an object to
20 determine if any one of a plurality of different features are associated with that object. Significantly,
21 labeled probes configured to selectively bind to at least one specific feature include at least two
22 different types of signaling components that can be spectrally distinguished. As described in detail in
23 the specification as filed, this result can be achieved by having each individual probe in a set of
24 labeled probes include two different optical signaling elements (see the probe bound to Feature 3 of
25 FIGURE 2B), or the set of labeled probes configured to selectively bind to a specific feature can
26 include some labeled probes having a first optical signaling component, and some labeled probes
27 having a different optical signaling component (see the set of labeled probes bound to Feature 3 of
28 FIGURE 2D). The cited art does not teach or suggest uniquely identifying a specific feature using
29 more than one optical signaling component. Claim 53 also recites that light from all optical signaling
30 components associated with an object are collected simultaneously. Dunlay specifically describes

1 collecting light from the different fluorescent dyes separately and sequentially. Thus, Claim 53 is
2 distinguishable over the cited art. Also, Claim 53 is encompassed in the originally submitted claims.

3 **In the event that the Examiner does *not* withdraw the restriction based upon the traverse to the
4 restriction presented above, applicants hereby elect Claims 34-35, and 37-51.**

5 Accordingly, all of the claims now remaining in the application define patentable subject
6 matter that is neither anticipated nor obvious in view of the prior art cited. The Examiner is thus
7 requested to pass the present application to issue in view of the amendments and the remarks
8 submitted above. If there are any questions that might be addressed by a further telephone interview,
9 the Examiner is invited to telephone the undersigned attorney, at the number listed below.

10 Respectfully submitted,

11 
12 Michael C. King
13 Registration No. 44,832

14 MCK/RMA:elm

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18 Date of Deposit: November 28, 2005

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